Contents

1.0 Introduction .............................................................................................................. 7
  1.1 Intended Audience .............................................................................................. 7
  1.2 Related Materials................................................................................................. 7
  1.3 Documentation Conventions ................................................................................. 7
  1.4 Laser Safety Information...................................................................................... 8
  1.5 Electrostatic Discharge Sensitivity (ESDS) Precautions.............................................. 8
  1.6 License Agreements............................................................................................. 8
  1.7 Technical Support................................................................................................ 9

2.0 Installation .............................................................................................................. 11
  2.1 Planning the Installation..................................................................................... 11
    2.1.1 Cable Requirements................................................................................11
  2.2 Installation Tasks Checklist................................................................................. 12
    2.2.1 Tools and Equipment Required ........................................................................ 12
    2.2.2 Check the Installation Site ....................................................................... 12
    2.2.3 Mark the Rack........................................................................................13
  2.3 Omni-Path Fabric Edge Switch Installation ............................................................ 14
    2.3.1 Mounting Hardware Kit Contents: ............................................................. 14
    2.3.2 Rack Mounting ....................................................................................... 14
  2.4 Reversing the Fan Airflow ................................................................................... 14
    2.4.1 Tools Required:...................................................................................... 18
    2.4.2 Procedures ............................................................................................ 18
  2.5 Installing the Q7 Management Module.................................................................. 20
    2.5.1 Tools Required:...................................................................................... 20
    2.5.2 Procedures ............................................................................................ 20
  2.6 Connect Equipment to the Ports and Power On the System ..................................... 22
  2.7 Setting Up the USB Console................................................................................ 23
  2.8 Bringing Up the System For the First Time ............................................................ 23
    2.8.1 Start-up Procedures................................................................................23
    2.8.2 Changing the Switch IP Address and Default Gateway through the CLI ..........23
  2.9 Component LEDs............................................................................................... 24
    2.9.1 Edge Switch .......................................................................................... 24

A Safety and Regulatory Compliance Information ....................................................... 29
  A.1 Safety Information ............................................................................................ 29
    A.1.1 Statement 1: ......................................................................................... 29
    A.1.2 Statement 2: ......................................................................................... 29
    A.1.3 Statement 3: ......................................................................................... 29
    A.1.4 Statement 4: ......................................................................................... 29
    A.1.5 Statement 5: ......................................................................................... 30
    A.1.6 Statement 6: ......................................................................................... 30
    A.1.7 Statement 7: ......................................................................................... 30
Figures
1. Laser Safety Information ................................................................. 8
2. Omni-Path Edge Switch Rail ............................................................. 14
3. Rail Installation Pin ........................................................................... 15
4. Installed the Rack Rails ................................................................. 15
5. Omni-Path Fabric Edge Switch Mounted in a Four Post Standard Rack ... 16
6. Switch Rail Adjustments ................................................................. 17
7. Rail Adjustment Notches ................................................................. 17
8. Switch Cover Thumbscrews (Top View) ........................................... 18
9. Fan Assembly Rotation ................................................................. 19
10. Wire Assembly Strain Relief and Airflow Direction Indicators .......... 19
11. Q7 Management Module ................................................................ 20
12. Management Module Slot ............................................................. 20
13. Installing the Q7 Module ............................................................... 21
14. Q7 Module Mounting Screw ........................................................ 21
15. Edge Switch Serial and Ethernet Ports ........................................ 22
16. Edge Switch LEDs ........................................................................ 24
17. Ports, Fabric Manager (FM), Managed (M), and FM Switch LEDs .... 25
18. Activating the FM Enable Switch LED ........................................... 27
19. Power Supply LEDs ...................................................................... 28
20. Airflow Direction LED ................................................................. 28

Tables
1. ........................................................................................................... 12
2. ........................................................................................................... 12
<table>
<thead>
<tr>
<th>Date</th>
<th>Revision</th>
<th>Description</th>
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1.0 Introduction

*Note:* This device has not been authorized as required by the rules of the Federal Communications Commission. This device is not, and may not be, offered for sale or lease, or sold or leased, until authorization is obtained.

This manual describes the hardware installation and initial configuration tasks for the Intel® Omni-Path Switches 100 Series. This includes:

- Intel® Omni-Path Edge Switches 100 Series, 48-port configurable edge switch

This manual is organized as follows:

Section 1.0 describes the intended audience and technical support.

Section 2.0 describes the hardware installation and initial configuration tasks.

Appendix A provides product specification information.

Appendix A provides product safety and regulatory information.

1.1 Intended Audience

This manual is intended to provide network administrators and other qualified personnel a reference for hardware installation and initial configuration for the switches.

1.2 Related Materials

- Intel® Omni-Path Switches GUI Users Guide
- Intel® Omni-Path Switches CLI Reference Guide
- Intel® Omni-Path Switches Release Notes

1.3 Documentation Conventions

This guide uses the following documentation conventions:

- *Note:* provides additional information.
- *Caution:* indicates the presence of a hazard that has the potential of causing damage to data or equipment.
- *Warning:* indicates the presence of a hazard that has the potential of causing personal injury.
- Text in blue font indicates a hyperlink (jump) to a figure, table, or section in this guide, and links to Web sites are also shown in blue. For example:
  - Table 2 lists problems related to the user interface and remote agent.
  - See “Installation Checklist” on page 6.
  - For more information, visit www.intel.com.
- Text in bold font indicates user interface elements such as a menu items, buttons, check boxes, or column headings. For example:
  - Click the Start button, point to Programs, point to Accessories, and then click Command Prompt.
  - Under Notification Options, select the Warning Alarms check box.
1.4 Laser Safety Information

This product may use Class 1 laser optical transceivers to communicate over the fiber optic conductors. The U.S. Department of Health and Human Services (DHHS) does not consider Class 1 lasers to be hazardous. The International Electrotechnical Commission (IEC) 825 Laser Safety Standard requires labeling in English, German, Finnish, and French stating that the product uses Class 1 lasers. Because it is impractical to label the transceivers, the following label is provided in this manual.

Figure 1. Laser Safety Information

1.5 Electrostatic Discharge Sensitivity (ESDS) Precautions

The assemblies used in the switch chassis are ESD sensitive. Observe ESD handling procedures when handling any assembly used in the switch chassis.

1.6 License Agreements

Refer to the Intel Software End User License Agreement for a complete listing of all license agreements affecting this product.
1.7 Technical Support

Intel Technical Support for products under warranty is available during local standard working hours excluding Intel Observed Holidays. For customers with extended service, consult your plan for available hours. For Support information, contact your Intel representative.
2.0 Installation

This section describes how to install and configure for first-time use:

- The Intel® Omni-Path Fabric Series switches in a network environment.

2.1 Planning the Installation

The Omni-Path switches are designed for installation in standard 19-inch equipment racks.

Racks should conform to conventional standards. Use the American National Standards Institute (ANSI)/Electronic Industries Association (EIA) standard ANSI/EIA-310-D-92 and International Electrotechnical Commission (IEC) 297

Racks should meet the following mechanical recommendations:

- Four-post, 19" rack to facilitate easy maintenance
- Universal mounting rail hole pattern identified in IEC Standard 297
- Mounting holes flush with the rails to accommodate the chassis

Note: Operation is subject to the following conditions:

Note: Use a rack grounding kit and a ground conductor that is carried back to earth or to another suitable building ground. Ground the equipment rack to earth ground.

Note: Provide enough room to work on the equipment. Clear the work site of any unnecessary materials. Make sure the equipment will have enough clearance for front and rear access.

2.1.1 Cable Requirements

2.1.1.1 Cable Distances

When planning the location of the switches, consider the distance limitations for signaling, EMI, and connector compatibility. It is recommended that the user does not exceed specified transmission rate and distance limits.

2.1.1.2 Cable Guidelines

Note: Building and electrical codes vary depending on the location. Comply with all code specifications when planning the site and installing cable.

When running cable to the equipment, consider the following:

- Do not run cables where they can be stepped on or rolled over.
- Be sure cables are intact with no cuts, bends, or nicks.
- If the user is making a cable, ensure that the cable is properly crimped.
- Provide proper strain relief for cables.
- Support cables using a cable manager mounted above connectors to avoid unnecessary weight on the cable bundles.
- Bundle cable using velcro straps to avoid injuring cables.
- Keep all ports and connectors free of dust.
- Untwisted Pair (UTP) cables can build up Electrostatic Discharge (ESD) charges when being placed into a new installation. Before installing category 5 UTP cables,
discharge ESD from the cable by plugging it into a port on a system that is not powered on.

- When required for safety and fire rating requirements, plenum-rated cable can be used. Check the local building codes to determine when it is appropriate to use plenum-rated cable, or refer to IEC standard 850.

### 2.1.3 Cable Handling and Bend Radius

Provide proper strain relief for the cables. Refer to the guidelines specified by your cable vendor.

Consider the following when selecting UPS equipment:

- The minimum amperage requirements for a UPS:
  - Calculate VA (volt-amperes): Locate the voltage and amperage requirements for each piece of equipment (usually located on a sticker on the back or bottom of the equipment). Multiply the numbers together to get VA.
  - Add the VA from each piece of equipment together to find the total VA requirement. Then add 30% to determine the minimum amperage requirements for the UPS.
- Transition time (the time necessary for the UPS to transfer from utility power to full-load battery power).
- The longest potential time period the UPS might be required to supply backup power.
- Whether the UPS unit provides online protection.

### 2.2 Installation Tasks Checklist

To perform the actual switch installation, the site implementation engineer must perform the following tasks, which are detailed in this section.

**Caution:** Be sure to review the safety information before starting the installation and during the installation process (refer to "Safety and Regulatory Compliance Information").

1. Check the installation site to verify the installation of cabinet power feeds, rails, and grounding.
2. Unpack the equipment and inspect for any shipping damage. Any shipping damage should be reported to the shipping company.
3. Verify that the equipment shipped matches the packing list.
4. Mark the rack and install the mounting rails.
5. Physically install the switch in the rack.

### 2.2.1 Tools and Equipment Required

- An ESD wrist strap
- A #0 and #2 Phillips screwdriver
- An M6 HEX nut wrench

### 2.2.2 Check the Installation Site

The switches are designed to be installed in an existing server cabinet (not a telco cabinet), where it can be mounted in a standard equipment rack.
Be sure of the following:

- The cabinet has a full earth ground to provide reliable grounding.
- There is enough room to work on the equipment.
- The equipment will have enough clearance for front and rear access.
- The cables can be accessed easily.
- Water or moisture cannot enter the switch.
- The ambient temperature stays between 50°–113°F (5°–40°C).
- Cabinet doors do not interfere with front-to-back air flow.

The cabinet should have its own switchable power distribution. If the switch has two power supplies, it is suggested that a cabinet with dual power distribution units is used.

It is recommended that cabinet anti-tip devices are used. This is especially true if installing or removing a switch in the upper half of the cabinet when the lower half is empty.

### 2.2.3 Mark the Rack

Allow enough vertical space in the rack for each specific switch installation.

1. Determine the location in the rack of the bottom of the switch.
2. Mark the upper (if applicable) and lower mounting positions on the vertical rails on the front of the rack.
3. Mark the upper (if applicable) and lower mounting positions on the vertical rails on the back of the rack.
2.3 Omni-Path Fabric Edge Switch Installation

This section describes the rack mounting instructions for the Omni-Path Fabric Edge Switch in a four-post standard-depth rack.

In a standard-depth rack, the distance between the front and back mounting posts is ~28" (700mm). Mounting rails for the switch are adjustable to accommodate racks with 26"–32" between mounting posts.

2.3.1 Mounting Hardware Kit Contents:

- ESD wrist strap
- One pair of mounting rails adjustable for 26"–32" installation range
- M6 hex head screws
- Front 1U perforated cover

2.3.2 Rack Mounting

Figure 2. Omni-Path Edge Switch Rail

1. Insert the rail installation pin in to the rack hole as shown in Figure 3. This holds the rail in place so the user can install the fan side screws. Fasten the rail using two (2) M6 screws. Torque screws to 30in-lb. Repeat this step for the second rail.
2. Fasten the port-side rails using four (4) M6 screws. Torque screws to 30in-lb. Note the orientation of mounting rails in Figure 4. The rails are shown from the front side of the rack.
3. The rails are designed for different mounting positions, from flush mount to recessed (in 1 inch increments) as shown in Figure 6.
Figure 6. Switch Rail Adjustments

4. To change the depth of the switch, insert your fingers into the rail adjustment notches and pull away from the switch as shown in Figure 7. This disengages the rail latches from the switch hat section.

Figure 7. Rail Adjustment Notches

5. Slide the switch to the desired depth in the rack. The switch is adjustable in increments of 1 inch. When the switch is at the proper depth, push the rail adjustment notches back to their original position to secure in place.
2.4 **Reversing the Fan Airflow**

This section details the procedure to reverse the airflow on the switch fan assembly from the default port-side exhaust position.

2.4.1 **Tools Required:**

- ESD wrist strap
- #0 Phillips screwdriver

2.4.2 **Procedures**

*Note:* Before removing the cover from the switch, first disconnect the power cord(s).

1. Loosen the 4 thumbscrews from the switch cover. There are 3 screws on the top, and 5 screws on the back. Lift the cover on a 45-degree angle, then pull to remove.

![Switch Cover Thumbscrews (Top View)](image)

2. Holding the fan assembly on the sides lift straight up and rotate the fan assembly 180 degrees as shown in Figure 9.
3. Lower the fan assembly straight down. The airflow direction indicators should now face towards the rear of the chassis as shown in Figure 10.

*Note:* Make certain to provide strain relief for the wire assembly.

4. Reattach the switch cover.
2.5 Installing the Q7 Management Module

This section details the procedure to install the Q7 Management Module into an existing unmanaged switch.

Figure 11. Q7 Management Module

2.5.1 Tools Required:

- ESD wrist strap
- #0 Phillips screwdriver
- Regular screwdriver

2.5.2 Procedures

1. Remove the switch cover as detailed in Section 2.4.2, Step 1. The Management Module slot is displayed in Figure 12.

Figure 12. Management Module Slot
2. Holding the module at approximately a 45-degree angle, slide the connector into module slot. Make certain to line up the notch on the module and the connector (see Figure 13).

**Figure 13. Installing the Q7 Module**

3. Once the module is seated properly in the connector, secure screw to the chassis using a regular screwdriver.

**Figure 14. Q7 Module Mounting Screw**

4. Reattach the switch cover.

---

*Intel® Omni-Path Fabric Switches*

*November 2015 Installation Guide*

*Doc. No.: H76456Rev 1.0US*
2.6 Connect Equipment to the Ports and Power On the System

Note: Before connecting equipment, it is important to understand the locations of the serial and Ethernet ports on the Omni-Path Fabric series switches. For the edge switch, these are located on the switch port side.

Figure 15. Edge Switch Serial and Ethernet Ports

1. Connect a Category 5 or 6 (Cat 5/6) Ethernet cable to the RJ-45 connector(s) on the switch. Connect the other end of the Cat 5/6 to an OOB LAN workstation, another switch or a hub.

2. Connect the switch to host(s)/switch(es) using QSFP cables.

Caution: It is important to provide strain relief for the cable connector.

2.6.0.1 Connecting Power

Note: For each power supply installed, a power cord must be installed in corresponding power inlet.

1. Provide strain relief for the power cable(s).
2. If necessary, replace the closeout over the switch fan side.
3. Connect the power cables to a power distribution unit (PDU) or a proper AC power outlet.
4. When the switch is plugged into an AC power outlet:
   a. The system powers up.
   b. The fans start.
   c. The system performs a power-on self test.
5. The switch, power supply(s), and fan LEDs light up.
2.7 Setting Up the USB Console


2. Open the FTDI Drivers Folder and Right click on the CDMv2.12 driver file and select Run As Administrator to install the necessary driver to access the USB serial console of the switch.

3. Open Putty, under Category, select Serial and enter the following parameters:
   - Serial Line to connect to: <Enter COM>
   - Speed: 115200
   - Data Bits: 8
   - Stop Bits: 1
   - Parity: None
   - Flow Control: None

2.8 Bringing Up the System For the First Time

2.8.1 Start-up Procedures

1. Power up the switch.

2. From its flash image on the management module, the switch begins its boot process.

3. Verify the IP address with the CLI command showChassisIpAddr command. The system returns information similar to the following:
   Chassis IP Address: 192.168.100.9 Net mask: 255.255.252.0

2.8.2 Changing the Switch IP Address and Default Gateway through the CLI

The CLI can be accessed two ways:

- using the switch serial port:
  - Edge switch (with optional management module): connects through the USB serial port

- through Ethernet, using Telnet or SSH

2.8.2.1 Using the Serial Connection

1. When a serial port connection is established, the user will see a prompt. To change the chassis IP address type:
   setChassisIpAddr -h <ipaddress> -m <netMask>
   where -h <ipaddress> is the new IP address in dotted decimal format (that is, xxx.xxx.xxx.xxx), and -m <netMask> is the new subnet mask in dotted decimal format.

2. To change the switch default gateway IP address type:
   setDefaultRoute -h <ipaddress>
   where -h <ipaddress> is the new default gateway IP address in dotted decimal format.

3. The changes are effective immediately.
2.8.2.2 Using Ethernet

1. Access the switch with one of the following commands using the default IP address:
   Telnet: telnet 192.168.100.9
   SSH: ssh 192.168.100.9

2. The system prompts for a user name. In order to change the IP address and default gateway, the user must be logged in as the administrator. At the prompt type admin and press ENTER.

3. The system prompts for a password. At the prompt type adminpass and press ENTER. The system responds with:
   Welcome to the <SWITCH> CLI. Type 'list' for the list of commands.

4. To change the switch IP address type:
   setChassisIpAddr -h <ipaddress> -m <netMask>
   where -h <ipaddress> is the new IP address in dotted decimal format (that is, xxx.xxx.xxx.xxx), and -m <netMask> is the new subnet mask in dotted decimal format.

5. To change the switch default gateway IP address type:
   setDefaultRoute -h <ipaddress>
   where -h <ipaddress> is the new default gateway IP address in dotted decimal format.

6. The changes are effective immediately.

2.9 Component LEDs

2.9.1 Edge Switch

Figure 16. Edge Switch LEDs

2.9.1.1 RJ45 LEDs

The RJ45 connectors have two LEDs, Link and Speed. The Speed LED is Green when a 100Mbps link is connected. The Link LED is Amber when an Ethernet link has been established, and blinking when the link is active.

2.9.1.2 Chassis Status LEDs

2.9.1.2.1 Status (STAT)

The status LED indicates one of the following conditions:
- Steady Green: the module is operating normally.
2.9.1.2.2 Attention (ATTN)

The Attention LED indicates one of the following conditions:
- **Off**: the system functioning normally.
- **Steady Amber**: the system requires some attention, which could indicate one of the following conditions:
  - The switch temperature is at a warning level on the module.
  - The switch silicon temperature is at a warning level (approximately 90 degrees C).
  - DC voltages on the board are slightly out of tolerance (12V Bulk, 5V, 3.3V and 1.8V are all monitored).
  - The module can no longer function properly. The system will take the appropriate actions to ensure that no damage is done to its components.
- **Blinking Amber** (once every four seconds): LED test state.

2.9.1.3 Ports, Fabric Manager (FM), Managed (M), and FM Switch

2.9.1.3.1 Ports

Each switch cable port has a **Green** link status LED that provide the following indications:
- **On**: the logical link is up (port is in the Active state).
- **Off**: the physical link is down (port is in the Down state).

2.9.1.3.2 Fabric Manager (FM)

The FM LED indicates that the switch is recognized by the active Fabric Manager.
2.9.1.3.3 Managed (M)

The Managed (M) LED indicates that a Q7 management module is installed switch.
2.9.1.3.4 FM Switch

On an unmanaged switch the FM Switch LED is used to restrict whether the end-node attached to a switch port is allowed to source Fabric Manager-related packets.

The user activates the LED using a small, straight instrument (e.g., a standard-size paper clip).

Figure 18. Activating the FM Enable Switch LED

The FM Enable Switch is used as follows:

Note: Actions take place approximately 1 second after releasing the button.

- Pressing the button for 4 seconds does a "Restore Factory Defaults" and reboots the ASIC
- Pressing the button for 2 seconds (and then releasing) puts the "FM control button persistent state" in configuration mode
  - The FM enabled LED will blink "n" times, where "n" is the current state value plus 1
  - Pressing (and releasing) the button once for less than 2 seconds advances the FM control persistent state by 1 (round-robin), and then it returns to step 1 (i.e., blinking the FM enabled LED)
  - Pressing the button for 2 seconds leaves the configuration state, and saves the FM control button state persistently, restoring the FM enabled LED to the proper value
2.9.1.4 Power Supply LEDs

**Figure 19. Power Supply LEDs**

**PSU1/PSU2:**
- **Green** indicates that DC power is normal.
- **Off** indicates a DC power failure or no DC power is present.

2.9.1.5 Airflow Direction LED

**Figure 20. Airflow Direction LED**

- **Green** indicates the fans are blowing from front to back.
- **Off** indicates the fans are blowing from back to front.
Appendix A Safety and Regulatory Compliance Information

This section provides regulatory compliance, safety and electromagnetic compatibility (EMC) information for the Intel® Omni-Path Fabric switches.

A.1 Safety Information

A.1.1 Statement 1:

Disconnect Device: This unit may have more than one power cord. To reduce the risk of electrical shock, disconnect all power cords before servicing unit.

A.1.2 Statement 2:

Chassis Lifting: Use safe practices when lifting.

Note: Use a team of people appropriate to the weight of each specified product and in conjunction with applicable guidelines. Whenever possible, use a mechanical lift.

A.1.3 Statement 3:

Energy Hazard: To reduce risk of electric shock, keep hands and fingers out of the power supply bays and backplane areas.

A.1.4 Statement 4:
Laser Radiation: certain optical products may emit laser radiation. Removing covers could result in exposure to hazardous laser radiation. Radiation may be emitted from connectors or fiber optic cables.

A.1.5 Statement 5:

No user-serviceable parts: Hazardous energy levels may be present inside power supplies and circuit card modules. Do not remove covers.

A.1.6 Statement 6:

Equipment Installation: Only qualified personnel should be allowed to install, remove or replace chassis or modules.

A.1.7 Statement 7:

Adding or Replacing Modules: These modules are intended only for installation in Intel® Omni-Path Fabric base units. Always install blanks when removing an active module. They prevent exposure to energy hazards inside the unit, contain EMI, and maintain cooling air balance in the chassis.